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Abstract

Currently there are several AMEDD electronic medical record initiatives, however none include eye examination data entry capability. WRAMC and other medical treatment facilities have recently employed the Integrated Clinical Database system (ICDB). The ICDB has addressed the access and legacy interface issues for a free-text template record. However, the ICDB does not have an eye examination data entry capability or eye examination record template. As primary eye care providers, optometrists need electronic access to medical information and the ability to add pertinent medical data to the ICDB. Recently a WRAMC contract optometrist was hired as part of an outcomes management initiative (now referred to as HEALTHeFORCES). This optometrist is mainly examining patients with diabetes and other systemic diseases, who have a higher incidence of ocular manifestations of systemic diseases.

The Total Eye examination Automated Module (TEAM) was incorporated into the WRAMC HealtheForces web-based electronic medical record (EMR), where it is called the EyeNote. The EyeNote EMR is fully operational and in wide use, both at WRAMC as well as at other MTFs that have implimented it.
The Marco optmometric equipment has been integrated with the HealtheForces EyeNote, allowing fully electronic capture of digital optometric patient data to the web-based intake form, and ultimately, to the HealtheForeces/ICDB Oracle database EMR.

Deliverable

1. Survey of Army Optometrists to determine what information should be incorporated into an Optometric Electronic Medical Record
2. Close coordination with the HealtheForces/ICDB application development team to design the web data pages for the "EyeNote".
3. Extensive testing by Army Optometrists of the prototype EyeNote for functionality and usability.
4. Multiple iterations of draft Web EyeNote developed by HealtheForces application development team.
5. Analysis with NARMC Telemedicine Directorate personnel of requirements for the electronic capture of patient data from Optometric Instruments (Marco, Humphery) as well as well from Vital Signs instruments (Welch-Allen).
6. Software application, written in Visual Basic, that automatically captures data from Marco optometric instruments, and populates the appropriate EyeNote data fields.

Problems Encountered

The major problem was difficulty in purchasing equipment in a timely manner. Part of this problem was due to a MEDCOM audit of WRAMC contracting. Although no serious issues were discovered during the audit, it took several months, during which time procurements were frozen.

Development of second generation data-capture client software was quite challenging, as was developent of web-based drawing tools.

The establishment of wireless platforms (e.g., PC tablets) for entering data into the EyenNote has been greatly hampered by the slow progess in the establishment of a secure 802.11 wireless network at WRAMC.

AMEDD-Wide Adoption

The HealtheForces EyeNote has been incorporated into several regional HealtheNotes web applications, for instance Fort Bragg, Fort Knox, and Fort Drum. It has been widely accepted by the Army Optometry community.

The next step truly depends on the next generation Electronic Medical Record (EMR), CHCS-II. HealtheForces and ICDB web-based EMRS are only an interim solution. The EyeNote technology and content needs to be integrated if possible into CHCS-II.

Conclusions

We have shown that a systematic process of functional requirement determination, followed by focused software development, can result in an EyeNote EMR that meets the needs of the vast majority of Army Optometrists. At WRAMC, the EyeNote has utilized over 2300 times over the past year. The integration and capture of digital eye exam data from the Marco system, and its automatic uploading to the EyeNote, has been utilized at WRAMC over 500 times over the past several months. The optometric EMR data, which now resides in an enterprise Oracle database, can form the basis of a data warehouse, which can form the basis of future developments (e.g., data mining and clinical decision support tools).